



## APPLICATION FORM

All applications must include the following information. Separate applications must be submitted for each eligible program. **Deadline: June 3, 2019.** Please include this application form with electronic entry. If you do not receive an email confirming receipt of your entry within 3 days of submission, please contact [Gage Harter](#).

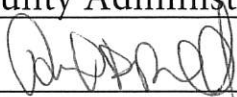
### PROGRAM INFORMATION

County: Roanoke County  
Program Title: Roanoke County Fire & Rescue Drone Program  
Program Category: Criminal Justice & Public Safety

### CONTACT INFORMATION

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### SIGNATURE OF COUNTY ADMINISTRATOR OR DEPUTY/ASSISTANT COUNTY ADMINISTRATOR

Name: Dan O'Donnell  
Title: County Administrator  
Signature: 

## **Executive Summary/Brief Overview**

Roanoke County Fire and Rescue's drone program offers an innovative solution to several problems faced in the delivery of fire, rescue and emergency medical services. The program includes three drones, with the newest having thermal imaging capabilities, or FLIR technology, allowing responders to "see" in the dark. A team of eight fire and rescue employees, trained according to Federal Aviation Administration (FAA) regulations, pilot the drones.

Roanoke County, situated in Virginia's Blue Ridge, encompasses 250 square miles with significant areas being rural and mountainous. The region is heavily promoted as an outdoor destination which includes many hiking and biking trails. A portion of the Appalachian Trail also lies within the boundaries of the County which brings many hikers to the area. With a high volume of visitors on the trails, the calls for service increase, particularly for lost or injured hikers. The drones allow emergency responders to look down on the trails and by using heat signatures, find lost or injured hikers in the dark, thus saving time and resources. The FLIR technology also has applications that are useful while fighting wildland fires and in the mitigation of hazardous materials incidents. The drones have also been used to gather valuable information for other County departments.

Before the acquisition of the drones, the only way to gain an overhead perspective was by utilizing another agency's helicopter which was not timely or cost effective. The department was fortunate to secure grant funding in the amount of \$11,000 to support the program.

## **The Problem/Challenge Faced by Roanoke County Fire and Rescue**

Roanoke County, situated in Virginia's Blue Ridge, encompasses 250 square miles with significant areas being rural and mountainous. The region is heavily promoted as an outdoor destination which includes many hiking and biking trails. A portion of the Appalachian Trail also lies within the boundaries of the County which brings many hikers to the area. With a high volume of visitors on the trails, the calls for service increase, particularly for lost or injured hikers.

The nature of work performed by fire and rescue services dictates the need to visualize the totality of a large incident scene. It is very helpful to have an "eye in the sky" when searching for missing persons, or when trying to locate the source of smoke in hilly, mountainous terrain. When a resident reports the smell of smoke, it could sometimes take hours of driving around curvy, mountain roads to spot the source. Roanoke County Fire and Rescue responds to many calls for wildland fires that can grow to many acres in size. During those incidents, it is essential to see from above where the fire is headed, what else may be threatened by the fire that people on the ground can't see, and just how large the fire is so that appropriate resources can be ordered. Another situation faced by the department is the potential for hazardous materials spills on either Interstate 81 or the many railroad tracks that dissect the County. In the event of a spill or a release, it is critical to have the ability to see from above the proximity to housing developments or businesses that could be impacted and need to be evacuated.

In the past, the most viable solution to these problems was to request assistance from other agencies such as the Virginia State Police or Carilion Clinic, which operate medical

transport helicopters. Requests for assistance with searches or locating smoke may go un-met, or may take hours to fulfill. That also takes valuable resources away from their intended purpose with those agencies. A helicopter meant for crime fighting or emergency medical transport is not best used for locating lost subjects or reconnaissance. To hire a private helicopter could also be time consuming and very expensive, at rates up to \$1,000 an hour. This is not feasible or cost effective.

### **Innovative Solution to the Problem/Funding/Staffing**

In 2015, with the increasing popularity of what the FAA refers to as Unmanned Aircraft Systems or “drones,” several members of Roanoke County Fire and Rescue already using these devices as hobbyists realized the potential benefits for firefighters and EMS providers during emergency situations. These members of the department presented their ideas to Administration and research began on the development of a drone program for the department.

In December 2017, using grant funds awarded from the Virginia Department of Fire Programs, the department purchased its first drone. After months of further research and training, the Roanoke County Fire and Rescue Drone Program became operational. Today, the program has eight trained and FAA-certified drone pilots and two additional drones that were purchased with grant funding secured from organizations such as the Appalachian Trail Conservancy. The most recently purchased drone has thermal imaging capabilities or FLIR technology, allowing responders to “see” in the dark. The total cost of the program, including equipment and training was \$11,000. There is a time commitment by those on the team. Pilots must first obtain a remote pilot certificate as prescribed by the FAA. Drone pilots must be able

to read weather maps and have a basic understanding of the various types of national airspace. There are no requirements for flight hours or classroom hours but each pilot must go through testing every two years, at \$150 for each pilot. In addition, the department opted to require its pilots to log one hour of flight time each month to ensure proficiency of skills.

Thanks to the grant funding and the commitment of well-trained department personnel, the drone program has fulfilled a much needed “eye in the sky” perspective. The department is now better equipped to assess emergency situations from a broader overhead perspective, thus increasing the response times to save lives and protect properties.

### **Results of the Program**

The results of Roanoke County Fire and Rescue’s drone program have proven to be most beneficial. Just 18 months into the program’s operation, the department has deployed the drones during emergencies and for reconnaissance purposes, including for other County departments.

In April 2018, a single-family home in the County was knocked off its foundation by a mudslide due to heavy rain and flooding in the area. Fortunately, the family asleep inside the house at the time of the mudslide was able to make it out safely. There were still concerns that another mudslide might occur in that same area. The drone team was deployed to safely survey the damage from above, and with the help of the County’s engineering department, monitor any shifting of the house or land that might impact nearby homes, as well as assess the area for additional mudslides.

The thermal imaging drone and its pilots were utilized during a recent wildland fire within Roanoke County, enabling them to “see” through the smoke of the fire and determine its actual size, direction of spread, and any homes that may have been threatened. Once again, this was accomplished in a faster and more inexpensive manner than borrowing a helicopter from another agency.

In the winter of 2018-2019, a neighboring locality asked for the assistance of the department’s drone team in locating a missing person along the Roanoke River during an especially frigid stretch of weather. The extreme weather conditions, proximity to the water and difficult terrain made it dangerous for responders to conduct a search by foot. In using the drone, pilots were able to locate the body of a deceased individual. While this call had an unfortunate outcome, it did provide closure for a worried family and the task was accomplished without further endangering other rescuers.

Not only does the drone team have applications for public safety but for other departments within Roanoke County as well. When Roanoke County Schools began planning for construction to renovate Cave Spring High School and needed to consider where to move students during the ongoing construction project, the drone team provided overhead photography to the planners, architects, engineers, and school officials to assist in making their plans. It also aided the Roanoke County Police Department in developing security plans for the times when students would be on campus.

The Roanoke County Economic Development Department has requested assistance from the drone team to be able to provide aerial photography of land parcels available for

development in the County. Some of those same photos have also been used in brochures and other marketing materials as well.

The Western Virginia Water Authority has also discussed with Fire and Rescue officials the possibility of being able to use the drones to inspect equipment like water storage towers. Often, these towers are many feet in the air and would need to be visually inspected for defects and corrosion by an individual climbing a tall ladder on the side of the tower or by using a system of ropes. By using the drone to inspect the equipment, the risks to personnel would be greatly reduced.

The ongoing Mountain Valley Pipeline project includes eight miles traversing through Roanoke County. Fire and Rescue officials have utilized the department's drones in coordination with Federal regulators working on the project to ensure mapping, markings and mileages stay current and correct. To be able to verify all of that information from the sky is crucial should there be an accident or disaster related to the pipeline and rescues or evacuations were to be needed. Obtaining that type of information is cost effective and safer than having a crew of employees within the construction zone, in rough terrain, walking the pipeline route for many miles.

The Roanoke County Fire and Rescue drone team also stands ready to assist state departments such as the Virginia Department of Emergency Management (VDEM) or Virginia Department of Transportation (VDOT). Should a large scale regional natural disaster strike southwest Virginia, VDEM may request the assistance of the drone team to assess the damage. Likewise, if VDOT were to have a large scale event on Interstate 81, they may need to know the impacts to traffic or the actual accident scene. Fire and Rescue officials have expressed interest

and willingness to help out other agencies and localities with the use of the drone team. The drone team is one of only a handful being utilized by municipalities across the region. A recent article in [The Roanoke Times](#) states that only 5 of 13 localities surveyed have purchased drones and some are not yet operational or have limited uses because the pilots have not become FAA certified. A recent story on NBC affiliate [WSLS TV 10](#) also speaks of the County's newest drone that has FLIR technology and the potential uses for it in the future.

### **Is the Drone Program a Model for Other Local Governments?**

Roanoke County Fire and Rescue's Drone Program is a model that other local governments can learn from or implement on their own. Likely, other local governments have employees who fly drones as a hobby or for recreational purposes, and have the skills and knowledge needed to operate a drone program for their departments. The requirements to become an FAA-certified drone pilot are relatively minimal with some time spent by the employee to study for and pass the test. There are many types of drones available with various capabilities. The newest drone purchased by Roanoke County Fire and Rescue with thermal imaging capabilities cost approximately \$4,600 and was procured using grant funding. A drone program can be easily managed by a local government, benefiting many departments within, and potentially across a region.